Voyager Fibre Storage Array Manual

P/N MAN VOYFC-UG-001

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Scope

This manual details the installation and configuration of Eurologic's Voyager Fibre Storage Array. It describes the single tower and single rackmount options as well as a description of how to daisy chain systems together.

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Chapter 1: Introduction

Fibre channel provides the means of transferring data over long distances with error checking at an astounding rate of 1 Gbit/Sec. The Voyager Fibre Storage Array incorporates leading edge technologies to deliver lightening performance coupled with unprecedented fault tolerance and flexibility.

The Voyager Fibre Storage Array incorporates a Fibre Channel backplane and provides unmatched investment protection while offering a truly modular system with a clear and simple expansion path. The Voyager Fibre Storage Array can be expanded to support Terabytes of data.

Add to all this the most comprehensive suite of fault tolerant features including redundant, hot swappable power supply units, drives, and advanced cooling modules and you have the ultimate in data integrity.

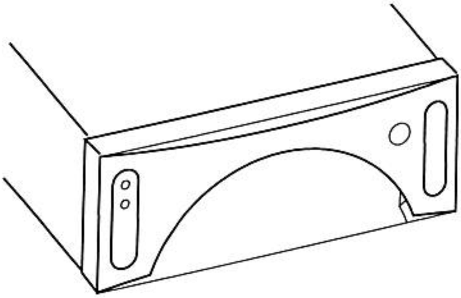
Features

- FC-AL 100MB/s transfer rate per fibre channel loop.
- Supports up to 7 disk drives per tower or shelf.
- Expandable system.
- Rack mountable.
- Passive FC-AL backplane.
- Support for 7,200 RPM and 10,000 RPM disk drives.
- No internal cabling.
- Enclosure Data Manager (EDM) monitors system conditions and all active components.
- Power supplies and disk drives are redundant and hot swappable.
- Aluminum device carrier allows for rapid heat dissipation and emissions reduction.

Device Carrier

Front loaded components such as disk drives and power supply units are housed in easily removable device carriers. The device is the basic building block of the series. The device carriers are of high quality anodized metal construction. This allows for rapid heat dissipation and conforms to the stringent requirements of CE and FCC standards. A diagram of a device carrier is shown in Figure 1-1.

Figure 1-1. Device carrier



Cooling

All models feature two Advanced Cooling Modules (ACMs) per shelf. The modules are mounted at the rear of the unit. One ACM is capable of cooling the entire shelf in the event of one ACM failing until a replacement ACM is installed.

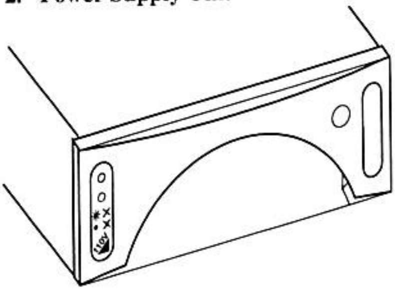
Environmental Monitoring

An optional Enclosure Data Manager (EDM) is available which monitors the ACMs and power supplies. The output of the EDM may be sent to a display unit, or more comprehensively, may be used as an input to Eurologic's Vision software. The EDM is unique in that it can warn the user of impending component failure rather than simply reporting the event after it has happened.

Power Supply Units

The Voyager Fibre Storage Array uses two high performance power supply units per backplane. A single power supply is rated at 180 Watts. Each power supply has greater than 500,000 hours Mean Time Between Failures (MTBF). In the event of one of the power supply units failing, the other power supply unit will easily power the entire tower or shelf until the failed unit is replaced. A diagram of the power supply unit is shown in Figure 1-2.

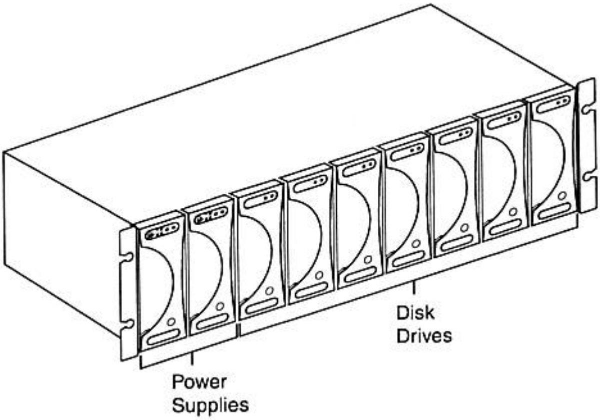
Figure 1-2. Power Supply Unit



Device shelf

The shelf is made up of nine storage bays and forms the housing for devices within the shelf. A diagram of the shelf is shown in Figure 1-3.

Figure 1-3. Device Shelf



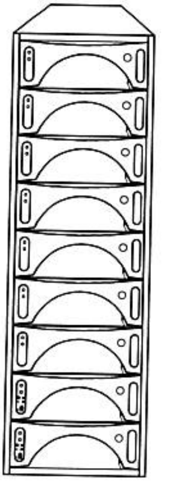
Configurations

The Voyager Fibre Storage Array comes in single tower or single rack mount shelf configuration.

Single tower configuration

The single tower configuration consists of two power supply units, a maximum of seven fibre channel disk drives, two advanced cooling modules (ACMs) and an optional enclosure data manager (EDM). The single tower is connected to your host system using the fibre channel cable selected. An example of the Voyager Fibre Storage Array single tower is shown in Figure 1-4.

Figure 1-4. Single tower configuration

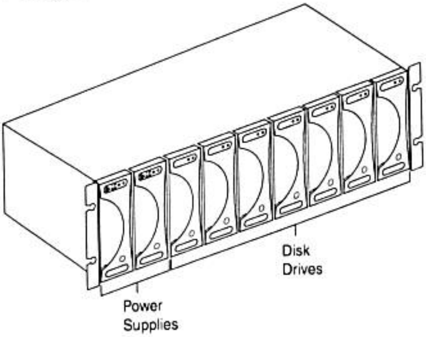


Single rack mount shelf configuration

The single rack mount shelf configuration can be mounted in any standard equipment rack with a front width of 19 inches. The procedure for mounting the shelf in the equipment rack is described in Chapter 2.

The single rack mount shelf consists of two power supply units, a maximum of seven fibre channel disk drives, two advanced cooling modules (ACMs) and an optional enclosure data manager (EDM). The single rack mount shelf is connected to your host system using the single fibre channel cable selected. An example of the Voyager Fibre Storage Array single rack mount shelf is shown in Figure 1-5.

Figure 1-5. Single rack mount shelf configuration



Chapter 2: Unpacking and Initial Setup

Unpacking the Voyager Fibre Storage Array

On receipt of the system visually inspect the exterior of the packaging for any signs of damage. If any damage is found, the carrier and Eurologic must be notified immediately, and they will advise you of the appropriate action. The cartons are sealed using packaging tape, which should be carefully cut open in the normal manner.

Remove the top foam layer from each box and exercise caution when lifting out the components. At this point the contents should be verified against the packaging list and Eurologic should again be notified if any discrepancies exist. The devices and power supply units are packed in anti-static packaging and anti-static precautions must be observed prior to removal.

Environmental recommendations for rack mounting the Voyager Fibre Storage Array.

When installing the Voyager Fibre Storage Array in a standard 19 inch equipment rack the following guidelines must be complied with to ensure the safe and efficient operation of the system. Eurologic's rack mount system may be installed in closed or open equipment racks. Once the following environmental, electrical and mechanical precautions have been taken.

Ambient Temperature

Installation of rack mount systems in standard 19 inch equipment racks may lead to a differential between the room ambient temperature and the internal ambient temperature of the rack environment. The maximum operating temperature of the

Voyager Fibre Storage Array is 40 degrees centigrade; however, it is not recommended that the system is run at the maximum temperature for extended periods of time.

Consideration should therefore be given to ensure that the room ambient temperature is kept at a temperature below 30 degrees centigrade.

Air flow

To ensure that internal heat build up is adequately dissipated into the room environment, air flow should in no way be restricted. It is essential that no vents or ducts are blocked and that the system is a minimum of 1 meter from a solid surface such as a wall or partition.

Air flow through the system is from front to rear.

Mechanical Loading

Consideration should be given to the loading of the cabinet. To maintain a low centre of gravity (thus reducing the likelihood of instability) equipment racks should (where possible) be installed from the bottom of the cabinet upwards. This is essential to ensure personal safety.

Electrical considerations

Circuit Overloading

Care should be taken to ensure that the current does not exceed the rating of the power source circuitry. This includes cabling, power distributions, filters and any other components through which the main AC flows. The power requirements of the Voyager Fibre Storage Array single tower or shelf are given in Table 2-1 .

Table 2-1 Power requirements

Amps	Volts
1.5	200 to 240
3.0	100 to 120

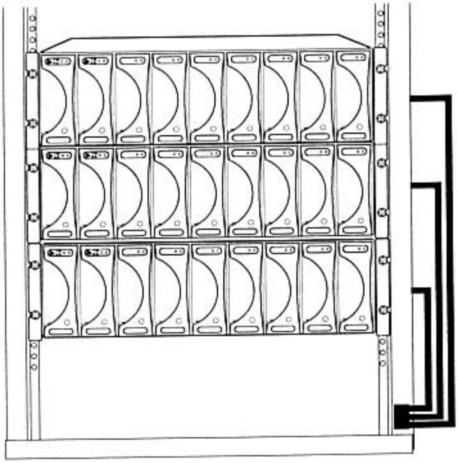
These power requirements must be added to the power demands of any other electrical devices installed in the equipment rack to calculate the total power consumption of the complete system. In addition, any surge currents must be catered for.

Disk drives normally consume twice the amount of current at start-up time than they use during steady state operation.

Grounding

It is recommended that all rack mounted shelves be grounded to a common point in the equipment rack. Each shelf should have a grounding braid running from it to this common grounding point (see Figure 2-1). A point for securing the grounding braid is provided at the rear of the shelf.

Figure 2-1. Grounding shelves within a 19 in. cabinet



Connecting braid, connected radially from each shelf to a common ground point.

Installing devices

This section details how to install devices, power supplies and advanced cooling modules (ACM) into the shelf. The procedure for installing the device shelf into a 19 in. cabinet is also described. The position of the power supplies and the disk drives within the shelf or tower is shown in Figure 2-2 .

Figure 2-2. Location of devices in tower or shelf

Power Supply	Power Supply	Disk Drive 7	Disk Drive 6	Disk Drive 5	Disk Drive 4	Disk Drive 3	Disk Drive 2	Disk Drive 1

Bay 8 Bay 0

WARNING: Before attempting to install any of the components, ensure that anti-static precautions have been taken. The minimum requirement is an anti-static wrist strap and grounding wire.

Power supply insertion

Power supplies are housed in carriers to allow for easy insertion. The power supply is designed for hot swappable operation. To achieve this, temperature sensitive current limiting is used. As the temperature to the power supply increases the current limiting function decreases, preventing undesirable surges.

Installing a power supply

To install a power supply unit in a tower follow this procedure:

1. Orient the power supply carrier so that the LEDs are on the left and the ejection button is on the right (for rack mount shelf orient power supply with LEDs on the top and ejection button on the bottom).
2. Insert the power supply carrier into either bay 7 or bay 8 of the tower or shelf (see Figure 2-2).
3. Push the carrier into the bay until you feel the power supply engage the backplane and ejection button on the front is fully extended. If the button is not fully extended, apply additional pressure to the front of the device carrier.

Disk drive insertion

Disk drives are housed in device carriers to allow for easy insertion.

Installing a disk drive

To install a disk drive follow this procedure:

1. Orient the disk drive carrier so that the LEDs are on the left and the ejection button is on the right (for rack mount shelf orient disk drive carrier with LEDs on the top and ejection button on the bottom).
2. Insert the disk drive carrier into any of the bays 0 to 6 of the tower or shelf

(see Figure 2-2).

3. Push the carrier into the bay until you feel the disk drive engage the backplane and ejection button on the front is fully extended. If the button is not fully extended, apply additional pressure to the front of the carrier.

Advanced cooling module insertion

The Voyager Fibre Storage Array is supplied with two ACMs mounted on the rear. Either ACM is capable of cooling the entire tower or shelf in the event of one of the ACMs failing until a replacement is installed. The ACMs are removable and hot swappable. The air flow created by the ACMs is from front to rear.

WARNING: Once you have removed an ACM from the tower or shelf you must block the resulting hole within 3 minutes using a new ACM or replace the failed ACM until a replacement is obtained. Failure to do so can seriously restrict air flow and cooling within the tower or shelf assembly.

Installing an advanced cooling module (ACM)

To install an advanced cooling module in a tower or shelf follow this procedure:

1. Hold the ACM assembly at 90 degrees to the tower or shelf. Align the two tabs on the bottom of the ACM with the cutouts on the rear of the tower or shelf.
2. Insert the tabs into the cutouts.
3. Attach the ACM cable to the connector on the fan cowl.
4. Align the captive thumbscrew on the ACM with the threaded hole on the tower or shelf.
5. Tighten the thumbscrew.

Rack mounting a disk shelf

The Voyager Fibre Storage Array rack mount shelf can be installed in a standard 19 inch equipment rack. To ensure correct functionality of the rack mounted shelf the guidelines set out previously in this chapter regarding environmental recommendations must be followed.

NOTE: When installing or removing a rack mount shelf, firstly remove all disk drives and power supply units. It is recommended that you work with at least one other person when handling the disk shelf to prevent personal injury and damage to the shelf.

Installing a shelf in an equipment rack

To install a shelf in a standard 19 inch equipment rack, follow this procedure:

1. On each of the front mounting rails of your equipment rack, select four holes that are spaced appropriately for the mounting holes on the shelf.
2. Align the holes on the flanges of the shelf with the holes you have chosen in (1) above.
3. Insert two of the screws provided with the shelf into the holes on the bottom flange of the shelf and the mounting holes of the equipment rack.
4. Insert the screws in the top flanges.
5. Tighten the screws

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Chapter 3: Cabling and Configuration

This chapter gives details of how the Voyager Fibre Storage Array is connected to the host system. It also describes how to set the fibre shelf IDs.

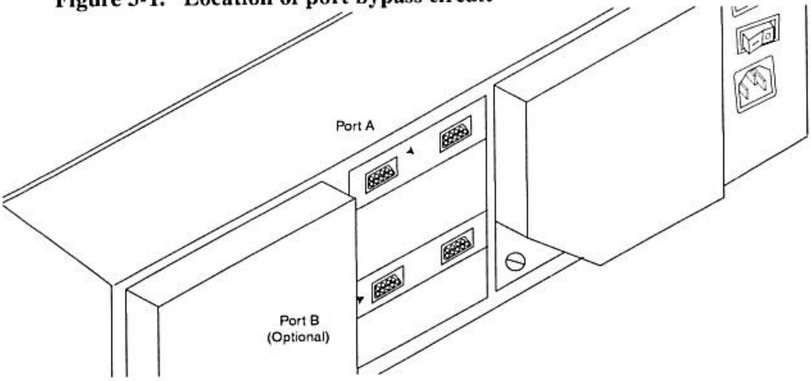
This chapter does not provide information relating to the connectors on the host system. For information relating to the host system, regarding the number and type of disk shelves it supports, refer to the user guide supplied with your host system.

NOTE: Static electricity can cause damage to both the host system and the Voyager Fibre Storage Array. Please observe anti-static precautions when connecting and configuring your Fibre system.

Cabling the Voyager Fibre Storage Array

The port bypass circuits at the rear of the tower (see Figure 3-1) provide the interface between the Voyager Fibre Storage Array and your host system.

Figure 3-1. Location of port bypass circuit



One port bypass circuit is installed as standard. There is an option to install a second port bypass circuit. By having two port bypass circuits installed there are two fibre channel loops through which the host system can access the data on the disk drives. This means that there is full redundancy for the port bypass circuits. For details on installing and removing the port bypass circuit, refer to Chapter 5.

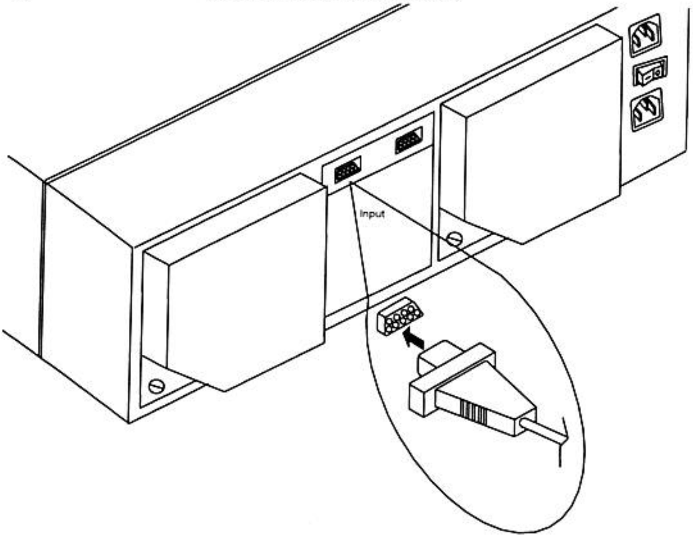
NOTE: If you have two port bypass circuits in the disk shelf you must have two fibre channel host cards installed in the host system or a single host card with support for two fibre channel loops.

The port bypass circuit board connects the Voyager Fibre Storage Array to the host system using a DB9 connector on a fibre channel cable. This fibre channel cable is the only connection between the Voyager Fibre Storage Array and the host system. All data, including data from the Enclosure Data Manager (EDM) is carried over this fibre channel cable. The following sections will detail how to connect the fibre channel cable between the Voyager Fibre Storage Array and the host system. It will also explain how to set the fibre shelf IDs.

Cabling the single shelf configuration

The single tower or single rack mount shelf is connected to the host system using a single fibre channel cable. At least one of the connectors on the fibre channel cable must be a DB9 connector. Attach the DB9 connector to the connector labeled *Input* of the port bypass circuit at the rear of the tower or shelf as shown in Figure 3-2.

Figure 3-2. Attaching the fibre channel cable



Connect the other end of the cable to the host system. Refer to the documentation supplied with the host system for details of the connectors on the host system. Attach the fibre channel terminator provided, to the connector labeled *Output/ Terminator* on the same port bypass circuit to complete the fibre channel loop.

Activating the ports

There are two switches located beside the thumbwheel switch on the rear of the Voyager Fibre Storage Array. These switches allow for dynamic loop expansion. These switches determine if the loop is terminated or not.

NOTE: The dynamic loop expansion capability is not currently implemented on the Voyager Fibre Storage Array.

Connecting shelves together

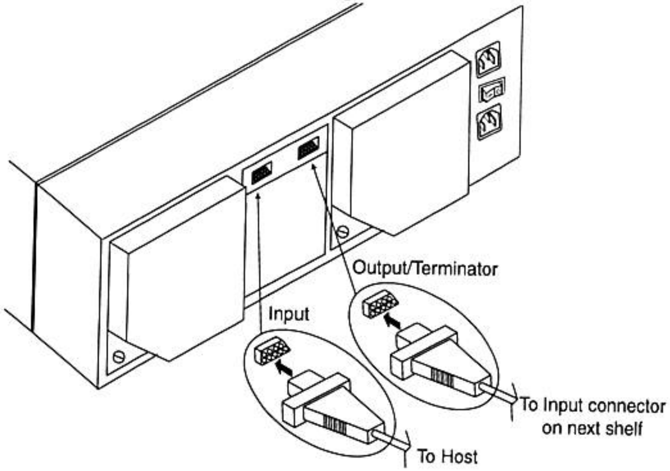
This section describes the procedure for connecting shelves together. The first shelf in the loop is connected to the host system and all subsequent shelves are connected together in a daisy chain configuration.

Connect the first shelf in the loop to the host system as described in "Cabling the single shelf configuration" on page 3-3. To connect a second shelf to the loop a fibre channel link cable is needed.

Attach one of the DB9 connectors on the fibre channel link cable to the connector marked *Output/Terminator* on the port bypass circuit of the first shelf. Attach the other end of this cable to the connector marked *Input* on the port bypass circuit of the second shelf (see Figure 3-3). To the last shelf on the loop, attach the fibre channel terminator to the connector labeled *Output/Terminator* on the port bypass circuit.

WARNING: The fibre channel terminator must be installed on the connector marked *Output/Terminator* of the last shelf on the fibre channel loop to close the fibre channel loop.

Figure 3-3. Connecting shelves together



Up to 16 shelves can be connected on the loop, with a maximum of 10 meters between each shelf.

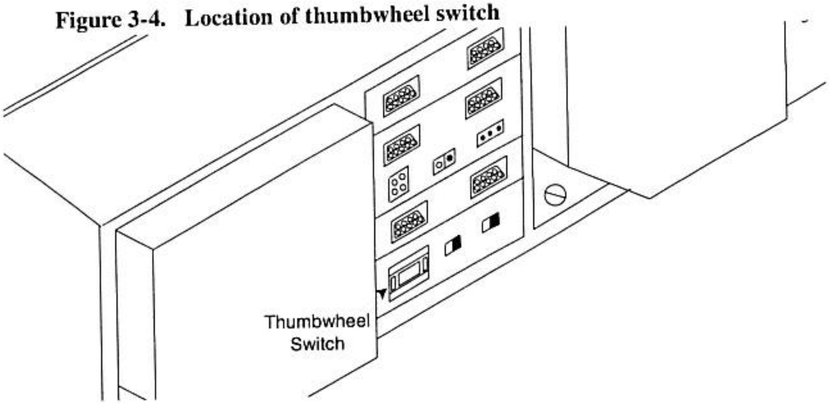
CAUTION: To achieve the maximum cable length of 10 meters there must be at least one fibre channel disk drive installed in any of the Bays 0, 1, 2 and one fibre channel disk drive installed in any of the Bays 4, 5, 6 of the tower or rackmount shelf (see Figure 2-2). For ESI communication a fibre channel disk drive must be installed in Bay 4. For ESI redundancy it is advised that a fibre channel disk drive be installed in bay 3 also. A typical configuration therefore, may have a drive installed in bays 2, 3, and 4.

Setting the fibre shelf IDs

Fibre channel uses a 7 bit binary code for addressing. The 3 Least Significant Bits set the disk drive IDs from ID 0 to ID 6. These 3 bits are set automatically by the backplane.

The 4 Most Significant Bits set the fibre shelf IDs using hexadecimal numbering. There are 16 possible IDs numbered from 0 to F. The fibre shelf IDs are set using the thumbwheel switch on the rear of the tower (see Figure 3-4).

Figure 3-4. Location of thumbwheel switch



Fibre shelf IDs can be set in any order. Table 3-1 lists the decimal number and its corresponding hexadecimal value.

Table 3-1 Thumbwheel Switch Value and Corresponding Decimal Value

Decimal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hexadecimal	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Table 3-2 shows how the shelf ID (as shown on the thumbwheel switch) corresponds to the disk drive ID.

Table 3-2 Shelf ID and related Bay ID

	Bay 0	Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6
Shelf ID 0	0	1	2	3	4	5	6
Shelf ID 1	8	9	10	11	12	13	14
Shelf ID 2	16	17	18	19	20	21	22
Shelf ID 3	24	25	26	27	28	29	30
Shelf ID 4	32	33	34	35	36	37	38
Shelf ID 5	40	41	42	43	44	45	46
Shelf ID 6	48	49	50	51	52	53	54
Shelf ID 7	56	57	58	59	60	61	62
Shelf ID 8	64	65	66	67	68	69	70
Shelf ID 9	72	73	74	75	76	77	78
Shelf ID 10	80	81	82	83	84	85	86
Shelf ID 11	88	89	90	91	92	93	94
Shelf ID 12	96	97	98	99	100	101	102
Shelf ID 13	104	105	106	107	108	109	110
Shelf ID 14	112	113	114	115	116	117	118
Shelf ID 15	120	121	122	123	124	125	RES.

NOTE: As can be seen from the above table the last shelf (Shelf ID 15) may contain only 6 disk drives; this is due to the fact that the ID 126 is reserved.

Attaching the Voyager Fibre Storage Array to a power source

Follow this procedure to connect the Voyager Fibre Storage Array to a power source:

1. Make sure that the power switch between the two power receptacles on the rear of the shelf is turned off
2. Attach the socket ends of the two provided power cords to the receptacles on the rear of the shelf.
3. Plug the other ends of the power cords into grounded electrical outlets.
4. Turn the power on by pressing the switch on the back of the disk shelf to the **on** position

WARNING: Each power cord supplies power to a separate power supply. This means that for both power supplies to provide DC voltage both power cords must be attached.

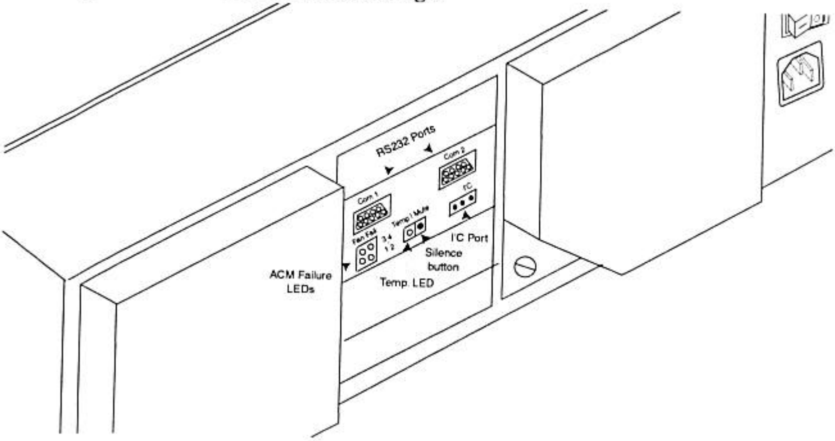
CAUTION: Static electricity can damage some cards installed in the host system. To avoid damaging these cards, shut down the host system and power off the disk shelf before you disconnect the fibre channel cable from the host system. In addition, wear an antistatic wrist strap and grounding wire when you disconnect the shelf from the host system.

Chapter 4: Environmental Monitoring

Enclosure Data Manager (EDM)

The EDM is primarily an environmental monitoring device. It sits on the backplane of the Voyager Fibre Storage Array. It gathers information about the state of the devices in the Fibre Storage Array such as power supply units, disk drives, ACMs and temperature. This section will describe the function of the EDM and how to interpret the LEDs and audible alarm fault indicators. A diagram of the EDM showing all the components can be seen in Figure 4-1

Figure 4-1. Enclosure Data Manager



EDM function

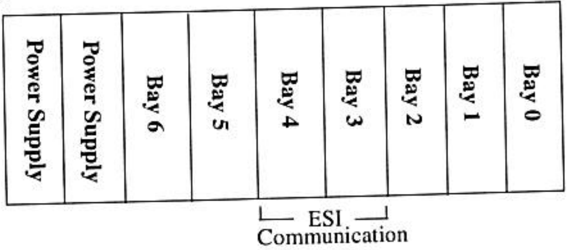
There are three main functions of the EDM. These functions are as follows:

- Collect data from the various 'sensors' in the enclosure, monitor this data, and activate various visible and audible indicators to denote failures and other conditions in the enclosure.
- Report the collected data to a host application using a variety of data formats.
- Receive 'control' information from a host application (using a variety of data formats) and carry out the 'commands' contained therein.

Communications

The Voyager Fibre Storage Array uses the Enclosure Services Interface (ESI) feature of fibre channel disk drives to communicate with the EDM. The ESI communication is carried out through bays 3 and 4 as shown in Figure 4-2

Figure 4-2. ESI Communication over bays 3 and 4.



The host system may request information from the EDM through fibre channel drive bays 3 and 4. The host system will send commands through the fibre channel cable to either bay 3 or bay 4 (which ever is free to communicate). The disk drive will then interpret the command and determine if it needs to obtain information from the EDM and return it to the host, or obtain more data from the host, and forward it to the EDM.

By having two disk drives configured for ESI communication there is full redundancy. If the drive in bay 3 is failed or missing then the EDM can communicate with the host system through the drive in bay 4. Likewise, if the drive in bay 4 is failed or missing then the EDM can communicate with the host system through the drive in bay 3. When a drive is installed in both bays 3 and 4 and these drives are operating correctly the host system will use the first available bay (3 or 4) for communication.

CAUTION: To use the EDM in your Voyager Fibre Storage Array you must have a fibre channel drive installed in either (or both) of the bays 3 or 4.

RS-232 and I^2C communication

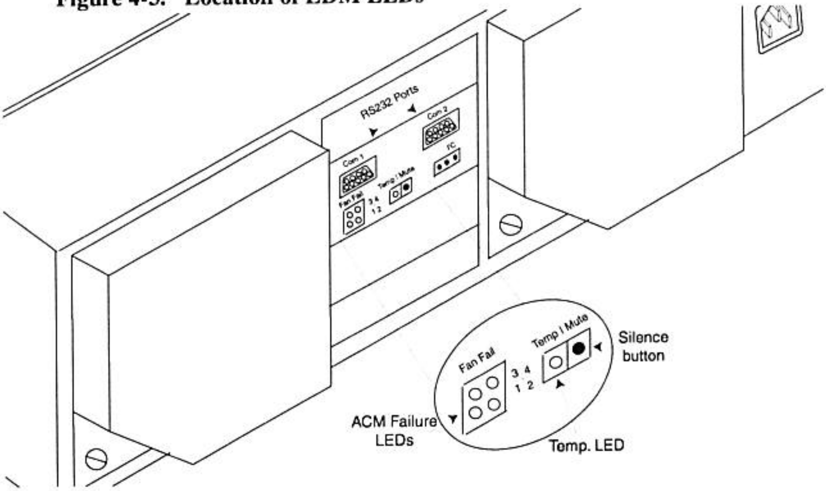
These features are not currently implemented on the Voyager Fibre Storage Array.

EDM fault notification

The enclosure data manager (EDM) has five LEDs which can be seen from the back of the shelf. This section describes how to interpret these LED indicators.

If the EDM detects a fan failure or over temperature condition, a buzzer on the EDM sounds and the LEDs on the EDM provide information about the operational status of the shelf.

Figure 4-3. Location of EDM LEDs



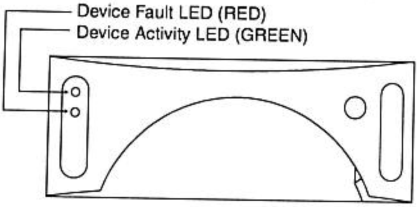
There are 5 LEDs on the EDM (see Figure 4-3), which are visible from the rear of the shelf. Four of these indicate the current state of the fans in the system. Two of the fan failure LEDs are not used in the single shelf configuration. If a failure occurs in any of the fans the corresponding LED on the EDM will light indicating a failure condition. The final LED, located beside the buzzer silence button, is used to indicate temperature failures.

NOTE: The alarm silence button, temporarily silences the alarm buzzer; it does not stop the error LEDs from flashing.

LED indicators on disk drive carriers

Each disk drive carrier in a disk shelf has two LED indicators on the front (see Figure 4-4).

Figure 4-4. LEDs on disk drive carrier



The disk device carrier LEDs function as follows:

- The green LED on the top (shelf in vertical upright position) is the device activity indicator. It is on or flashing when the disk is active.
- The red LED on the bottom (shelf in vertical upright position) is the device fault indicator. The LED is steadily on when the disk has failed. The LED flashes when the disk is spinning down or up.

Table 4-1 describes how to interpret both LEDs.

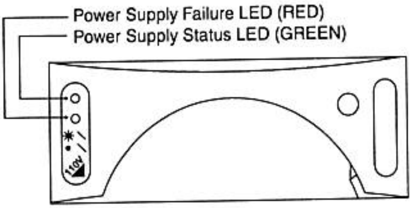
Table 4-1 Disk drive LED definitions

Device fault LED	Device activity LED	Meaning
Off	On	Disk operates normally
Off	Flashing	Disk operates normally
Off	Off	Disk is inactive and there is no fault

LED indicator on the power supply carrier

The power supply for the disk shelf has two LED indicators (see Figure 4-5).

Figure 4-5. LEDs on the disk shelf power supply


Power Supply Failure LED (RED)
Power Supply Status LED (GREEN)
110V

These power supply status LEDs function as follows:

- The green LED on the top (shelf in vertical upright position) is the power supply status indicator.
- The red LED on the bottom (shelf in vertical upright position) is the power supply failure LED. It is normally off. If a failure has occurred, the LED turns on steadily or flashes at regular intervals. See Table 4-2 for the mean-

ing of the LED interval patterns.

Table 4-2 Power supply LEDs

LED color/ location	LED activity	Meaning
Green - top	On	Power supply is functioning properly.[1]
	Off	An input power problem exists or the power supply is not functioning properly.
Red - bottom	Off	Power supply and fans are functioning properly
	On	Power supply malfunction or input power problem exists.[2]

[1] DC Voltage OK signal causes the power supply green LED to light. It does not mean that AC is being supplied to the power supply. Ensure that BOTH power cords are attached.

[2] Need EDM installed to drive this LED.

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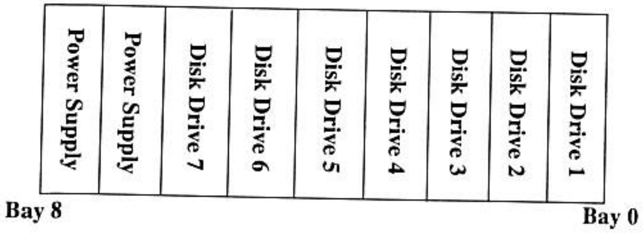
Chapter 5: Replacing components

This chapter deals with replacing components in the Voyager Fibre Storage Array from a field replaceable point of view. It will go through the procedure for removing and installing components such as the disk drives, power supplies, ACMs and the EDM. The procedure for replacing a disk shelf in an equipment rack is also described.

Replacing devices

The position of the power supplies and the disk drives within the shelf or tower is shown in Figure 5-1 .

Figure 5-1. Location of devices in tower or shelf



WARNING: Before attempting to install or remove any of the components, ensure that anti-static precautions have been taken. The minimum requirement is an anti-static wrist strap and grounding wire.

Replacing a power supply

Power supplies are housed in easily removable carriers to allow for easy insertion and removal. The power supply is designed for hot swappable operation. To achieve this, temperature sensitive current limiting is used. As the temperature to the power supply increases the current limiting function decreases, preventing undesirable surges. If removing and replacing the *same* power supply you must ensure that at least one (1) minute has elapsed between removal and re-insertion. This is necessary to allow components to cool to ambient temperatures.

Removing a power supply

To remove a power supply unit follow this procedure:

1. Press the ejection button on the front of the power supply.
2. With the ejection button still pressed grasp the carrier handle and slowly pull the power supply out of the tower or shelf. Use both hands to support the weight of the power supply.

Installing a power supply

To install a power supply unit follow this procedure:

1. Orient the power supply carrier so that the LEDs are on the left and the ejection button is on the right.
2. Insert the power supply carrier into either bay 7 or bay 8 of the tower or shelf (see Figure 5-1).
3. Push the carrier into the bay until you feel the power supply engage the backplane and ejection button on the front is fully extended. If the button is not fully extended, apply additional pressure to the front of the device carrier.

Replacing a disk drive

Disk drives are housed in device carriers to allow for easy insertion and removal. Prior to complete removal of the disk drive from the tower or shelf, you must ensure that the disk drive has fully spun down. This is necessary as centrifugal forces may damage the drive. You must make sure that adequate shock precautions are complied with.

Removing a disk drive

To remove a disk drive unit follow this procedure:

1. Press the ejection button on the front of the disk drive carrier.
2. With the ejection button still pressed grasp the carrier handle and slowly pull the disk drive out of the tower or shelf. Use both hands to support the weight of the disk drive.

Installing a disk drive

To install a disk drive follow this procedure:

1. Orient the disk drive carrier so that the LEDs are on the left and the ejection button is on the right.
2. Insert the disk drive carrier into any of the bays 0 to 6 of the tower or shelf (see Figure 5-1).
3. Push the carrier into the bay until you feel the disk drive engage the backplane and ejection button on the front is fully extended. If the button is not fully extended, apply additional pressure to the front of the carrier.

Replacing an advanced cooling module (ACM)

The Voyager Fibre Storage Array is supplied with two ACMs mounted on the rear. Either ACM is capable of cooling the entire tower or shelf in the event of one of the ACMs failing until a replacement is installed. The ACMs are removable and hot swappable. The air flow created by the ACMs is from front to rear.

WARNING: Once you have removed an ACM from the tower or shelf you must block the resulting hole within 3 minutes. The hole should be blocked by installing a new ACM or by leaving the failed ACM in position until a replacement is obtained. Failure to do so can seriously restrict air flow and cooling within the tower or shelf assembly.

Removing an advanced cooling module (ACM)

To remove an advanced cooling module from the tower or shelf follow this procedure:

1. Loosen the captive thumbscrew that secures the ACM to the disk shelf.
2. Swing the ACM assembly away from the shelf, but do not pull the tabs on the bottom of the assembly out of the shelf.
3. Detach the cable from the connector on the metal cowl.
4. Pull the ACM away from the shelf by disengaging the two tabs on the bottom of the ACM from the shelf.

Installing an advanced cooling module (ACM)

To install an advanced cooling module in a tower or shelf follow this procedure:

1. Hold the ACM assembly at 90 degrees to the tower or shelf. Align the two tabs on the bottom of the ACM with the cutouts on the rear of the tower or shelf.
2. Insert the tabs into the cutouts.
3. Attach the ACM cable to the connector on the metal cowl.

4. Align the captive thumbscrew on the ACM with the threaded hole on the tower or shelf.
5. Tighten the thumbscrew.

Replacing a disk shelf

The Voyager Fibre Storage Array rack mount shelf can be installed in a standard 19 inch equipment rack. To ensure correct functionality of the rack mounted shelf the guidelines set out previously in this chapter regarding environmental recommendation must be followed.

NOTE: When installing or removing a rack mount shelf, it is recommended that you remove all disk drives and power supplies. It is also recommended that you work with at least one other person; this is necessary to prevent personal injury and damage to the shelf.

Removing a shelf from an equipment rack

To remove a shelf from an equipment rack, follow this procedure:

1. Shut down the host system and turn off the power.
2. Turn off the power switch on the rear of the shelf and disconnect the shelf power cords.
3. Disconnect the fibre channel cable that connects the shelf to the host system.
4. Remove the screws from the flanges of the disk shelf mounting bracket.
5. Remove the disk shelf from the equipment rack.

Installing a shelf in an equipment rack

To install a shelf in a standard 19 inch equipment rack, follow this procedure:

1. On each of the front mounting rails of your equipment rack, select four holes that are spaced appropriately for the mounting holes on the shelf.
2. Align the holes on the flanges of the shelf with the holes you have chosen in

(1) above.

3. Insert two of the screws provided with the shelf into the holes on the bottom flange of the shelf and the mounting holes of the equipment rack.
4. Insert the screws in the top flanges.
5. Tighten the screws

Replacing the Enclosure Data Manager (EDM)

The EDM is located in the rear of the shelf or tower of the Voyager Fibre Storage Array. The EDM is a replaceable component that collects and reports data pertaining to the environmental conditions that exists inside the shelf or tower. The EDM can not only report a failure when it has occurred but it can also report when a failure is about to take place. To replace the EDM these steps must be followed:

Removing an EDM

To remove an EDM follow these steps:

1. Release the two thumb screws holding the EDM plate in position using a flat head screwdriver.
2. Grasping the EDM, pull the EDM slowly out of the shelf or tower.

Installing an EDM

To install an EDM follow these steps:

1. Orient the EDM such that the connectors on the EDM are aligned with the connectors on the backplane.
2. Insert the card into the slot on the rear of the shelf and push it in firmly until the metal plate sits flat against the rear of the shelf.
3. Tighten the thumb screws using a flat head screwdriver.

Replacing the Port Bypass Circuit

The port bypass circuit is located on the rear of the tower or shelf and provides the means by which the host system can access the Voyager Fibre Storage Array. Follow this procedure for replacing the port bypass circuit:

Removing the Port Bypass Circuit

1. Release the two thumb screws holding the port bypass circuit in position using a flat head screwdriver.
2. Grasping the port bypass circuit slowly pull the port bypass circuit out of the tower or shelf.

Installing the Port Bypass Circuit

1. Orient the port bypass circuit such that the connectors on the port bypass circuit are aligned with the connectors on the backplane.
2. Insert the port bypass circuit into the slot on the rear of the shelf and push it in firmly until the metal plate sits flat against the rear of the shelf.
3. Tighten the thumbscrews.

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Appendix A: Technical Specifications

GENERAL	
Host Bus Interface	Fibre Channel 200MB/s Full Duplex Mode with dual redundant port bypass circuits
Number of Host Interfaces	2 (Dual loop)
Maximum Drives per Shelf	7
Devices Supported	3.5" FC-AL
Maximum Capacity Per Storage Array	126 GB (Twin Tower)
Drive Interface	FC-AL
Redundant and Hot Swappable Power Supply Units (PSU's)	Yes. Removable from the front
Redundant and Hot Swappable Advanced Cooling Modules (ACM's)	Yes. Removable from the rear
Backplane	Passive Fibre Channel

MONITORING	
Temperature Monitoring	Yes
Fan Monitoring	Yes
Power Supply Monitoring	Yes
Disk Drive Monitoring	Yes
Failure Notification	Audible Alarm, LED, Optional Software Reporting, In-Band Reporting

ELECTRICAL and ENVIRONMENTAL	
Input Voltage	110 or 220 V AC, 50/60 Hz
Operating Temperature	5°C to 40°C
Operating Humidity	5% to 95% (with a gradient of 10%or less per hour)
Regulatory Approvals	CE, FCC Class A, CSA, UL 1950
Warranty	3 years

PHYSICAL	**Max No. of Drives**	**Dimensions mm (inches)**	**Weight KGs (lbs)**
Single Tower	7	383x220x516 (15x9x20)	13.6 (30)
Twin Tower	14	383x355x516 (15x14x20	24.4 (54)
19" Rackmount	7 per shelf	335x480x131 (13x17x5)	6.7 (15)

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